Nano vaccines for infectious diseases

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Recent years have seen the development of novel technologies using nanoparticles and microparticles to deliver vaccines by the oral and transdermal route of administration. These new technologies enable the formulation of vaccine particles containing vaccine antigens, without loss of their biological activity during the formulation process. Also, multiple antigens, targeting ligands and adjuvants can all be encapsulated within in the same particle. When administered orally, these particles are designed to withstand the acidic environment of the stomach and are targeted to the Peyer’s patches and the gut associated mucosal immune system. Since these vaccines are particulate in nature, they are readily taken up by phagocytic antigen presenting cells (APCs’s), such as M cells, dendritic cells and macrophages in the Peyer’s patches of the intestines, resulting in a strong immune response and antibody production. Of particular interest in this formulation is the fact that the particles release the antigen in a slow and sustained manner over a prolonged time period, intracellularly into APC’s, resulting in strong mucosal and systemic immunity after oral administration, without the need for added adjuvants that are typically present in current vaccine preparations. Since no needles are required, for oral vaccines, this method of vaccine delivery is inexpensive and suitable for mass vaccination in the developing world as well as for the developed world. This presentation discusses studies conducted on a wide array of vaccines including infectious disease vaccines such as TB, typhoid, influenza, pneumonia, meningitis and hepatitis B vaccine antigens suggest that this delivery system is highly suitable for antigens to be used for protective immunity. This method of vaccine delivery enables the delivery of a wide spectrum of vaccines for prophylactic and therapeutic use.

Biography

Martin J D’Souza has completed his PhD from the University of Pittsburgh, PA. He is the director of Graduate Programs at Mercer University, College of Pharmacy and Co-Director of the Center for Drug Delivery. He has published more than 80 manuscripts and is on the editorial board of several journals.

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